

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 April 2001 (05.04.2001)

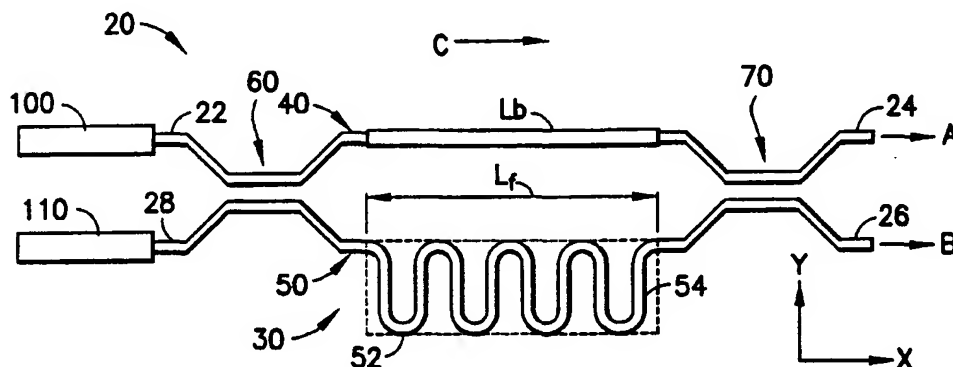
PCT

(10) International Publication Number
WO 01/23955 A3

- (51) International Patent Classification⁷: G02F 1/225, G02B 6/12
- (21) International Application Number: PCT/US00/25867
- (22) International Filing Date:
21 September 2000 (21.09.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/155,287 21 September 1999 (21.09.1999) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK,
DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO,
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG,
UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
18 October 2001

[Continued on next page]

(54) Title: A NANOPHOTONIC MACH-ZEHNDER INTERFEROMETER SWITCH AND FILTER



(57) Abstract: A nanophotonic Mach-Zehnder interferometer (MZI) (20) device having at least one arm (50) which has an actual length greater than its virtual length (L_v). An arcuate section (52) is provided in at least one arm (50) (thus providing a "meandering arm") to increase the actual length of that arm without increasing its virtual length (L_v) and without compromising the ability of that arm to effect a π phase shift in an optical signal propagating therein. By constructing the MZI device of strongly confined waveguides, which may be either photonic-well or photonic-wire devices, the low bending loss characteristics of such waveguides enable the use of an arcuate section (52) or bend in the waveguide without experiencing undesirable losses in the optical signal. The actual length of the arm and the optical length are equivalent to those for prior art devices and sufficient to introduce the desired phase shift. In contrast to prior art devices, however, the present invention provides those sufficient actual and optical lengths in a significantly reduced length on the chip (i.e., its virtual length) that requires less on-chip real estate and thus provides for denser integration of a plurality of optical devices in an optical component.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 00/25867

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G02F1/225 G02B6/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02F G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 289 256 A (GRAMLING HUBERT) 22 February 1994 (1994-02-22)	1-5, 7, 10-14, 18-22, 26-30
Y	column 3, line 59 -column 4, line 19 column 5, line 42 - line 64 column 7, line 22 -column 60 column 9, line 3 - line 53; figures 3-5 --- -/--	8, 9, 16, 17, 24, 25, 32, 33

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

11 April 2001

Date of mailing of the international search report

26/04/2001

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/25867

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	column 6, line 39 -column 7, line 6; figure 21	8,9,16, 17,24, 25,32,33
X	----- KHALFALLAH S ET AL: "Highly unbalanced GaAlAs-GaAs integrated Mach-Zehnder interferometer for coherence modulation at 1.3 μm " OPTICS COMMUNICATIONS,NL,NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, vol. 167, no. 1-6, 15 August 1999 (1999-08-15), pages 67-76, XP004176850 ISSN: 0030-4018	1,2,5, 26,27,30
Y	Chapters 2, 3	8,9,32, 33
A	figures 1-6	6,15,23, 31
Y	----- US 5 790 583 A (HO SENG-TIONG) 4 August 1998 (1998-08-04) the whole document	8,16,24, 32
Y	----- US 5 878 070 A (HO SENG-TIONG ET AL) 2 March 1999 (1999-03-02) the whole document -----	9,17,25, 33

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/25867

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